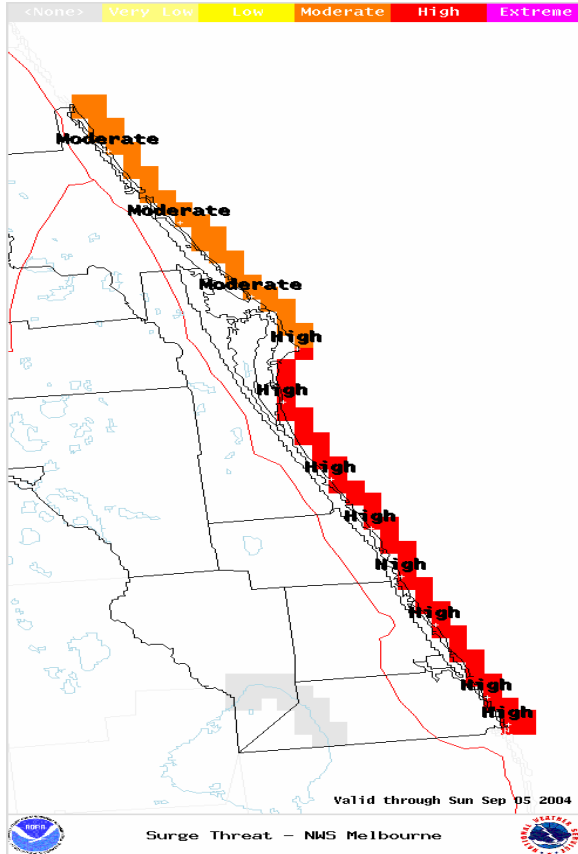




Experimental

Tropical Cyclone Surge Threat Product



Description: Issued by the local Weather Forecast Office (WFO) during tropical cyclone situations, the *Tropical Cyclone Surge Threat* product responsibly depicts the impending threat of the associated surge hazard from a location-centric perspective. It conveys the maximum level of threat projected for the event using a color-coded index scale ranging from 0 to 5, *Non-Threatening* to *Extreme*. Levels are based on the magnitude of surge, but the likelihood of occurrence is also factored in by using probabilistic storm surge information and the average forecast track error with time. Locally, an assessment of the magnitude of the surge includes such situational information as the intensity and direction of the wind, the slope of the continental shelf, local bathymetry and dry-land relief, coastal configuration (barrier islands, bays, inlets, mouths of rivers, etc.), the contribution of astronomical tides, and the effects of battering waves. Thus, it effectively employs both deterministic (e.g., surge height) and probabilistic (e.g., uncertainty) components of the forecast for a more complete expression of the combined surge threat. A description of each threat level is readily available. Product release is triggered

by the issuance of a tropical cyclone Watch or Warning anywhere within the defined area. Routine updates are provided shortly after each official advisory and are continued until tropical cyclone surge waters are no longer an immediate threat to local communities near the coast.

Utility: The *Tropical Cyclone Surge Threat* product uses an index scheme to distill the abundance of threat assessment information regarding coastal flooding into a single plan-view map that is easy-to-understand. For visual simplicity, warm colors (yellow and orange) are used for lower threat levels with hotter colors (red and purple) reserved for higher threat levels. The product is designed to motivate less-sophisticated users to action regarding preparedness and impending evacuation activities near the coast. It also highlights the minimum corresponding actions and relates them to potential impacts. For more-sophisticated users, this product serves as an excellent starting point for critical decision-making and is a coherent briefing tool. In gridded (and shape file) form, it can be ingested into Geographic Information Systems to address specific vulnerabilities, in context of the actual meteorological situation, for a more detailed assessment of the potential impact of coastal flooding.

For Example: Upon the issuance of a tropical cyclone Watch or Warning, coastal residents might investigate the *Tropical Cyclone Surge Threat* product to raise personal awareness and assess the potential for local evacuation orders. Officials would have a greater indication of the extent to which certain locations are being threatened, as well as those areas in danger of being hardest hit by combined surge waters.

Note: The example image depicts the surge threat associated with Hurricane Frances (2004) as expressed within 24 hours of landfall in east central Florida. Threat level depictions are based on the forecast height of the surge, but also account for inherent forecast uncertainties. Tides and waves are also considered.



Hazard – Tropical Cyclone Surge



Threat Index Level	Description
Extreme	<ul style="list-style-type: none"> • Threat: An extreme threat to life and property. • Minimum Action: Preparations should be made for the likelihood of an extreme storm surge; surge heights of 9 feet or higher. • Potential Impact: The potential for coastal flood waters which cause widespread inundation of the immediate coastal zone by sea water, possibly reaching several miles inland for low-lying areas. Extreme beach erosion with several new inland cuts likely created. Many large sections of near-shore roads washed out and/or low-lying escape routes roads flooded. Powerful scouring surge waters and intense battering wind waves breaching dunes and seawalls in widespread locations to result in structural damage to numerous shoreline buildings, with several washing into the sea. Damage accentuated from considerable floating debris. Extensive damage to marinas, docks, and piers. Numerous small craft broken away from moorings.
High	<ul style="list-style-type: none"> • Threat: A high threat to life and property. • Minimum Action: Preparations should be made for the likelihood of a major storm surge; surge heights of 6 to 8 feet. • Potential Impact: The potential for coastal flood waters which cause partial inundation of the immediate coastal zone by sea water, especially for low-lying areas. Severe beach erosion. Several sections of near-shore roads washed out and/or low-lying escape roads flooded. Scouring surge waters and battering wind waves breaching dunes and seawalls in scattered locations to result in structural damage to several shoreline buildings, with a few washing into the sea. Damage accentuated by floating debris. Damage to marinas, docks, and piers. Several small craft broken away from moorings, especially in unprotected anchorages.
Moderate	<ul style="list-style-type: none"> • Threat: A moderate threat to life and property. • Minimum Action: Preparations should be made for the likelihood of a moderate storm surge; surge heights of 4 to 5 feet. • Potential Impact: The potential for coastal flood waters which cause major beach erosion. A few sections of near-shore escape roads weakened or washed out, especially in historically vulnerable low spots. Surge waters and wind waves breaching dunes and seawalls in scattered locations to result in structural damage to a few shoreline buildings, mainly in historically vulnerable spots. Minor damage to marinas, docks, and piers. A few small craft broken away from moorings, especially in unprotected anchorages.
Low	<ul style="list-style-type: none"> • Threat: A low threat to life and property. • Minimum Action: Preparations should be made for the likelihood of a minor storm surge; surge heights of 2 to 3 feet. • Potential Impact: The potential for coastal flood waters which cause moderate to locally major beach erosion. Very heavy surf breaching dunes and seawalls in isolated locations, mainly in historically vulnerable spots.
Very Low	<ul style="list-style-type: none"> • Threat: A very low threat to life and property. • Minimum Action: Preparations should be made for the likelihood of a very minor storm surge; surge heights of 2 feet or less. • Potential Impact: The potential for coastal flood waters which cause heavy surf and moderate beach erosion.
Non-Threatening	<ul style="list-style-type: none"> • Threat: No discernable threat to life and property. • Minimum Action: Evaluate disaster plan; ensure seasonal preparedness activities are complete. • Potential Impact: Coastal flooding from surge waters not expected; surf conditions may still be rough with minor beach erosion.

Note: In all cases, listen to local authorities and obey any evacuation orders for your coastal area. Remember, increasing wind and rising waters can cut off escape routes well in advance of landfall.